

RESISTANCE

Experiment Report

Submitted To Fulfill the Assignment of Electricity and Magnetism Course

Lecturer: Dr. Eka Cahya Prima, M.T



Arranged by:

Lina Christina (1603532)

Nadia Mubarakah (1604009)

Ulvi Asdi Salikha (1600932)

INTERNATIONAL PROGRAM ON SCIENCE EDUCATION DEPARTMENT

FACULTY OF MATHEMATICS AND SCIENCE EDUCATION

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A. Materials required

1. Power supply
2. Wire
3. Resistors
4. Voltmeter
5. Ammeter
6. Protoboard

B. Question to Electric Current

1. How are the resistances in series and parallel derived?

Answer: The derivations of the expressions for series and parallel resistance are based on the laws of conservation of energy and conservation of charge, which state that total charge and total energy are constant in any process. These two laws are directly involved in all electrical phenomena and will be invoked repeatedly to explain both specific effects and the general behavior of electricity. These energies must be equal because there is no other source and no other destination for energy in the circuit.

C. Experiments

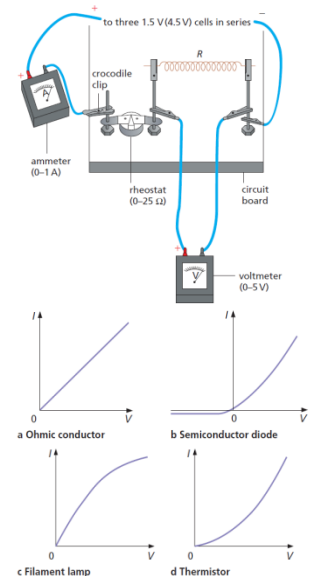
1. Proving the Ohmic Resistance

- a. Experiment procedure

Set one resistor and one rheostat side by side on protoboard. And then, using wires and crocodile clip as connectors, and ammeter and voltmeter. Then, connect two wires which are connected to voltmeter to both legs of resistor. Same goes for ammeter, but one wire is connected to rheostat and resistor's leg. Note the reading in both devices.

- b. Data of result

Current (mA)	Voltage (V)
2.6	0.0
2.8	0.05
3.0	0.06
3.5	0.12
4.0	0.12
7.5	0.17
10.9	0.23



c. Finding and Conclusion

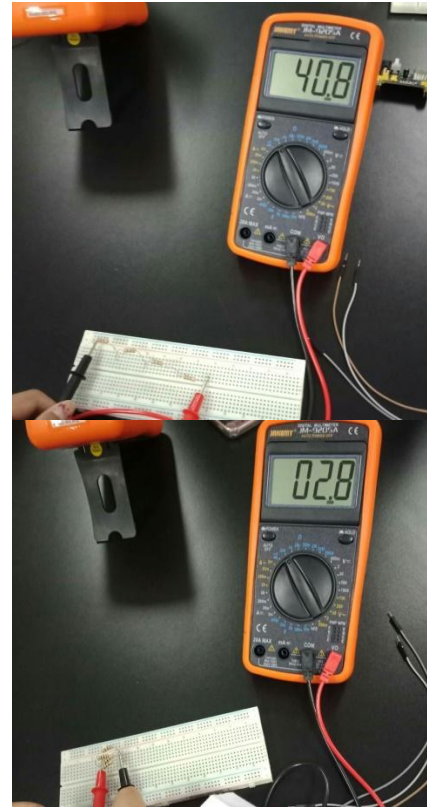
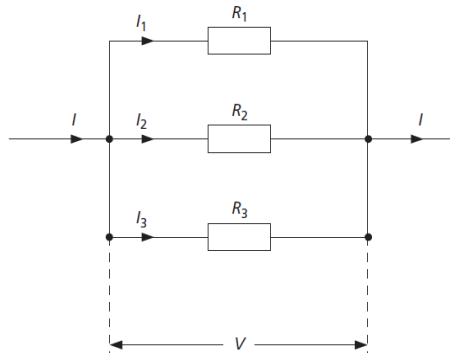
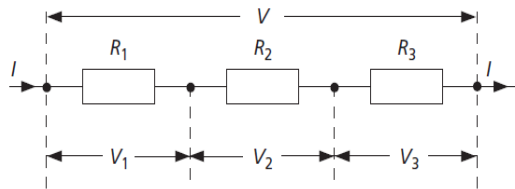
After the experiment, it can be concluded that the curve of Ohmic Resistance is well proven. The relationship between Current and Voltage in ideal situation as stated as Ohm's Law is directly proportional which means when current increases, voltage also increases.

2. Analyzing the resistance in series and parallel

a. Experiment procedure

Set resistors on the protoboard as the design which has made before, whether it would be series or parallel and how many resistors will be used. Prepare one ammeter and voltmeter to measure current and voltage of the circuit. Note the reading in both ammeter and voltmeter.

b. Photograph of result



c. Finding and Conclusion

Each resistor is marked $10\ \Omega$. The upper picture is series circuit. Because in series, the reading of current is $40\ \Omega$ as fit to the formula of resistance in series in which is the sum of the entire resistor. And for parallel circuit, the reading of ammeter is $2.8\ \Omega$ or $3.3\ \Omega$ calculated theoretically using resistance's formula in parallel circuit. The conclusion is when it comes to

series circuit, the current will be the same for each resistor and in parallel circuit and the current will be divided for each resistor.

D. Attachment for Experiment 2

Group 4

Nadia Mubarakah

Lina Chistina

Ulvi Asdi Salikha

Resistance

No.	Resistors	Type	Measurement (Ω)	Theory (Ω)
1.	2	Series	21,1	20
2.	3	Series	32,3	30
3.	4	Series	40,6	40
4.	2	Parallel	5,2	5
5.	3	Parallel	3,9	3,33
6.	4	Parallel	2,8	2,5

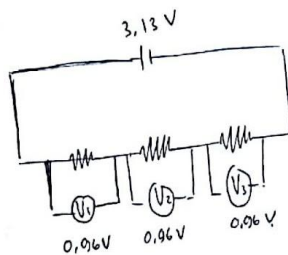
Measurement in Series

$$V_{tot} = 3,13 \text{ V}$$

$$V_1 = 0,96 \text{ V}$$

$$V_2 = 0,96 \text{ V}$$

$$V_3 = 0,96 \text{ V}$$



Measurement in Parallel

$$V_{tot} = 1,1 \text{ V}$$

$$V_1 = 0,86 \text{ V}$$

$$V_2 = 0,86 \text{ V}$$

